587. SCIENCE STANDARDS - GRADE 4, SECTIONS 588 THROUGH 598.

The samples associated with the content standards are meant to illustrate meaning and to represent possible areas of applications. They are not intended to be an exhaustive list, but are samples of applications that would demonstrate learning.

588. UNIFYING CONCEPTS OF SCIENCE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand systems, order, and organization.	a. Recognize that a system is an organized group of related objects that form a whole.	i. Create a model of a system using existing curriculum (electricity, space, food chain, rock cycle).
	b. Explore the solar system.	
02. Understand concepts and processes of evidence, models, and explanation.	a. Develop skills in observation and data collection.	i. Collect and classify samples of igneous, sedimentary, and metamorphic rocks. ii. Observe and draw the phases and positions of the moon over a period of time.
	b. Recognize the difference between observations and inferences.	
	c. Develop and/or use models to explain how things work.	i. Create a solar system model and explain moon phases (eclipses, orbits). ii. Create a model of a system using existing curriculum (electricity, space, food chain, rock cycle).
03. Understand constancy, change, and measurement.	a. Explore concepts in science that do not change with time.	i. Show that the boiling point is always the same temperature (depending upon elevation). ii. Discover at what temperature water freezes.
	b. Understand that changes occur and can be measured.	
	c. Measure using standard and metric systems.	i. Measure the length of another person's shadow at morning, noon, and afternoon.
04. Understand the theory that evolution is a process that relates to the gradual changes in the universe and of equilibrium as a physical state.	a. Understand the relationships of past, present, and future.	i. Diagram the rock cycle. ii. Create a timeline of our solar system and predict possible what it might occur in the future
05. Understand concepts of form and function.	a. Discover the relationship between shape and use.	i. Investigate Native American tools and why they were developed that way. ii. Improvement of shape and use in technology (microscope, telescope). iii. Investigate how technology has been used to improve the shape and function of items such as cars, scientific equipment, etc.

589. CONCEPTS OF SCIENTIFIC INQUIRY.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand scientific inquiry and develop critical thinking skills.	a. Identify questions that can be answered by conducting scientific tests.	i. What type of cup keeps water cooler? ii. Hypothesize which cup will stay cooler and why.
	b. Conduct scientific tests.	i. Conduct an experiment using paper, plastic, glass, and Styrofoam, as insulators.
	c. Use appropriate tools and techniques to gather and display data.	i. Graph class results using temperature data. ii. Use a calculator to determine averages of data.
	d. Use data to construct a reasonable explanation.	i. Develop an explanation why one cup's content stays cooler or warmer than the other does.
	e. Make simple predictions based on data.	i. Draw conclusions for cup usage for lemonade or hot chocolate.
	f. Explore alternative explanations.	i. Analyze and compare the properties and designs of the cups. ii. Discuss and recognize other possible variables.
	g. Communicate the results of tests to others.	i. Present data to an audience in a meaningful way.

590. CONCEPTS OF PHYSICAL SCIENCE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the structure and function of matter and molecules and their interactions.	a. Use simple instruments to measure properties.	i. Measure dimensions in metric and standard. ii. Measure temperatures Fahrenheit and Celsius.
	b. Explore the properties of solids, liquids, and gases.	i. Investigate the properties of ooblick. ii. Present a solid, a liquid, and a gas using an ice cube.
	c. Know that heating and cooling can cause changes of state in common materials.	i. Draw a picture of the water/rock cycle and label where the physical changes are occurring. Describe why this is a physical change.
02. Understand concepts of motion and forces.	a. Investigate the effect of pull/push on the motion and direction of objects.	i. Activities to demonstrate Newton's Laws.
	b. Research different forms of energy.	i. Use different materials to insulate an ice cube and determine which works best. ii. Place a drop of food coloring in both hot and cold water and compare results.

	c. Explore and investigate the six simple machines: demonstrate that the six simple machines can decrease the amount of force necessary to complete a task.	i. Complete class experiments using pulleys, levers and fulcrums, inclined planes, wheels and gears and screws.
03. Understand the total energy in the universe is constant.	a. Compare and contrast potential and kinetic energy.	

591. CELLULAR AND MOLECULAR CONCEPTS.

Cellular and Molecular Concepts standards do not apply at this grade level.

592. INTERDEPENDENCE OF ORGANISMS AND BIOLOGICAL CHANGE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the theory of biological evolution.	a. Investigate diversity of plants and animals and how they adapt in order to survive in their environment.	i. Compare and contrast the life cycles of grasshoppers, frogs, butterflies, and humans. ii. Refer to "Project Wild," "Project Wet," "Project Learning Tree" activities.
	b. Investigate how plants and animals become extinct if their adaptations do not fit their environment.	
	c. Recognize the difference between vertebrate and invertebrate animals: classify vertebrate animals (mammals, reptiles, birds, fish, amphibians).	

593. MATTER, ENERGY, AND ORGANIZATION IN LIVING SYSTEMS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the relationship between matter, energy, and organization to trace matter as it cycles and energy as it flows through living systems and between living systems and the environment.	a. Know that living systems require energy to survive.	i. Using geraniums cover some leaves using plastic wrap and aluminum foil. Observe changes in the leaves.
	b. Understand the food chain and know that organisms both cooperate and compete in ecosystems.	i. Create a food web using a ball of string passed from student to student. Remove the plant life. Observe the effects on the rest of the web.

594. EARTH AND SPACE SYSTEMS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand scientific theories of origin and subsequent changes in the universe and earth systems.	a. Explore the length of a day, the seasons, the year, phases of the moon, and eclipses.	i. Once a week, record the length of a day throughout the school year. ii. Measure the length of a human shadow at noon in October, January, and May. iii. Model an eclipse using paper circles and a flashlight.
	b. Compare and contrast the contents of the solar system.	
	c. Explore the effect of gravity on the solar system; include elements within the solar system such as the Earth, Moon, and tides.	

595. TECHNOLOGY.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the relationship between science and technology and develop the abilities of technological design and application.	a. Know that technology is a means by which people use knowledge, tools, and systems to make their lives easier and better.	i. Make a poster showing one-way technology makes your life easier (outhouse versus toilet).
	b. Recognize that people have invented tools for everyday life and for scientific investigations.	i. Collect pictures of tools that are in your home. Explain how these tools make everyday life easier.
	c. Create a tool to perform a specific solution.	
	d. Use available and appropriate technology.	

596. PERSONAL AND SOCIAL PERSPECTIVES.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand common environmental quality issues, both natural and human induced.	a. Identify issues in the local environment.	i. Compile a case study of a local environmental issue and describe its impact on Idaho's economy. • Water quality • Air quality • Hazardous waste • Forest health
02. Understand the causes and effects of population change.	a. Understand the effect of technological development and human population growth on local towns and/or Idaho.	i. Compare and contrast pictures of your city today and ten years ago. ii. Compare and contrast the differences between a small town and a larger town in Idaho.

03. Understand the importance of natural resources and the need to manage and conserve them.	a. Understand the concept of recycling.	i. Collect trash and divide into renewable and nonrenewable resources. ii. Participate in a recycling program. iii. Field trip to a recycling center. iv. Make your own recycled paper. v. Build a compost pile. vi. Make things (planters, bird feeders, mobiles, toys) using recyclable materials.
	b. Understand the conservation of natural resources.	i. Compare and contrast the different forms of transportation and their impact on natural resources (public transportation, automobiles, bicycles).
04. Understand different uses of technology in science and how they affect our standard of living.	a. Identify examples of technologies used in scientific fields.	i. Food production. ii. Environmental cleanup. iii. Advances in medicine. iv. Communications. v. The space program. vi. Weather forecasting.

597. HISTORY OF SCIENCE.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand the significance of major scientific milestones.	a. Understand major contributions of various scientists and researchers.	i. Choose a scientist from a topic studied this year and explain how their contribution was significant to society.

598. INTERDISCIPLINARY CONCEPTS.

Standard - The student will:	Content Knowledge and Skills:	Samples of Applications:
01. Understand that interpersonal relationships are important in scientific endeavors.	a. Work in teams to solve problems.	i. Compare and contrast the difficulties of solving a problem alone or in teams. ii. Given a triangular puzzle, work in teams to solve. Discuss the results.
02. Understand technical communication.	a. Read and understand instructions.	i. Build a model using written instructions.